

## CHAPTER 6

### **ANALYSIS AND INTERPRETATION OF QUANTITATIVE DATA: RESPONSES FROM TEACHERS**

#### **6.1 INTRODUCTION**

Chapter 5 dealt with analysis and interpretation of quantitative data with respect to responses from learners. Likewise, in this chapter I will present and discuss the information gathered from the teacher questionnaires. The responses were given on a three point Likert scale with a score of 1 (depending on the nature of the question) representing either Regularly, Agree or Always, a score of 2 representing either Occasionally, Neutral or Sometimes and a score of 3 corresponding to either Never or Disagree. The development of the items in the teacher questionnaire was based on classroom observations, focus group interviews and the literature review as reported upon in chapter 4. The statistical information in this chapter was derived from a sample of 26 teachers purposely selected from 26 schools (including the 10 schools used in the quantitative part of the study). These schools include ten schools which were used during qualitative research comprising five high-performing schools and five low-performing schools in mathematics. There were six teachers from high-performing schools and twenty from low-performing schools. No statistical tests were used in this chapter and the analysis of teacher responses is descriptive because of the small sample.

Questions were structured to probe for factors that facilitate achievement in mathematics. The questions were categorised as follows for gaining information under the following headings:

- A Teachers' commitment
- B Teachers' attitude and self-concept
- C Teachers' perceptions of and interaction with learners
- D Teachers' instructional methods
- E Teachers' perceived causes for poor performance in mathematics.

The item numbers that relate to each of the five categories are given in Table 6.1 below.

Table 6.1 Distribution of items into categories

Category	Number of items	Item numbers in the questionnaire
A. Commitment	10	7, 9, 11, 12, 13, 14, 15, 16, 27, 52
B. Attitude and self-concept	7	17, 18, 19, 21, 22, 24, 51
C. Perceptions of and interaction with learners	6	20, 28, 41, 42, 43, 50
D. Instructional methods	8	23, 25, 26, 45, 46, 47, 48, 49
E. Perceived causes for poor performance in mathematics	13	65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77

## 6.2 TEACHERS' REPONSES TO THE QUESTIONNAIRE

### 6.2.1 Category A: Teachercommitment

The aim of this section was to establish how committed and serious teachers were in their personal and learners' development in mathematics. Teacher's personal development in mathematics is assumed to improve their efficacy in teaching (Stigler & Hiebert, 1999).

Table 6.2.1 Teacher commitment

	HPS	LPS
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<b>Item 7</b> Attend any college/university course in mathematics	Yes	83.3	55
	No	16.7	45
<b>Item 9</b> Attend any college/university course on the teaching of mathematics	Yes	66.7	35
	No	33.3	65
<b>Item 11</b> Observe other teachers teaching mathematics	Yes	50	65
	No	50	35
<b>Item 12</b> Meet with a local group of teachers to study/discuss mathematics teaching issues	Yes	83.3	85
	No	16.7	15
<b>Item 13</b> Attend a workshop on mathematics teaching	Yes	100	90
	No	0	10
<b>Item 14</b> Serve as a mentor and /or peer coach in mathematics teaching for other teachers	Yes	50	52.7
	No	50	47.4
<b>Item 15</b> Attend any mathematics teacher professional association meetings	Yes	66.7	47.4
	No	33.3	52.6
<b>Item 16</b> Invite guest speakers or organised field trips relevant to the mathematics taught in class	Yes	33.3	30
	No	66.7	70
<b>Item 27</b> Involve parents in the mathematics education of their children	Regularly	16.7	5
	Occasionally	66.7	65
	Never	16.7	30
<b>Item 52</b> Assist learners after normal class	Always	66.7	50
	Sometimes	33.3	50
	Never	0	0

I now analyse and discuss the results for individual items.

<i>Attending courses on mathematics</i>		HPS	LPS
<b>Item 7</b> Attend any college/university course in mathematics	Yes	83.3	55
	No	16.7	45

From the data it seems that teachers from high-performing schools attend college/university mathematics courses more than teachers from low-performing schools. In this regard around 83% of teachers from high-performing schools indicate attendance in comparison to 55% of teachers from low-performing schools. It is pleasing to see that even for low-performing schools more than half the teachers attend college or university mathematics courses. There seems to be a culture of attending college or university mathematics courses for personal improvement in the subject, to a greater extent in high-performing schools than in low-performing schools. It should be noted that this question could have caused confusion as it may not have been understood as attending courses after their initial training as was the intention.

<i>Attending courses on teaching mathematics</i>		HPS	LPS
<b>Item 9</b> Attended any college/university course on the teaching of mathematics	Yes	66.7	35
	No	33.3	65

It is also clear that teachers from high-performing schools attend college/university mathematics teaching courses more regularly than teachers from low-performing schools. In this regard around 67% of teachers from high-performing schools indicate regular attendance in comparison to 35% of teachers from low-performing schools. Almost two thirds of teachers from low-performing schools do not attend mathematics teaching courses, denying themselves an opportunity to grow in this regard. An interpretation of

this finding is that teachers from high-performing schools are more likely to improve their teaching skills than teachers from low-performing schools.

<i>Observing other teachers teaching mathematics</i>		HPS	LPS
<b>Item 11</b> Observe other teachers teaching mathematics	Yes	50	65
	No	50	35

When the teachers were asked about whether they observe other teachers teaching mathematics, more teachers from low-performing schools (65%) responded positively compared to only half the teachers from high-performing schools. This is somewhat surprising but could perhaps be interpreted that teachers from high-performing schools consider themselves more competent than their colleagues and that they do not feel the need to observe their colleagues in action. Teachers from low-performing schools clearly experience this need as more important and they seem to realise that they need more exposure to good teaching strategies.

<i>Local group meetings of teachers</i>		HPS	LPS
<b>Item 12</b> Meet with a local group of teachers to study/discuss mathematics teaching issues	Yes	83.3	85
	No	16.7	15

In this question the percentage difference in the responses was very small. Most teachers from both high-performing and low-performing schools seem to meet with other teachers to discuss mathematics teaching issues on a regular basis. It could be that teachers interpreted this question as asking about attendance of workshops organised by the department in preparation for the new curriculum.

<i>Mentor for other teachers</i>		HPS	LPS
<b>Item 14</b> Serve as a mentor and / or peer coach in mathematics teaching for other teachers	Yes	50	52.6
	No	50	47.4

There is no noticeable difference between teachers from high or low-performing schools in this regard. This data is interesting as it shows that poor performing schools make no less an effort to provide fellow teachers with advice and coaching. Yet the effort seems to be wasted as the poor performances of these schools indicate.

<i>Attending meetings of a mathematics teacher professional association</i>		HPS	LPS
<b>Item 15</b> Attend any mathematics teacher professional association meetings	Yes	66.7	47.4
	No	33.3	52.6

A comparison of teachers from high-performing schools and low-performing schools on teachers' attendance of mathematics teacher professional association meetings reveals that teachers from high-performing schools attend such meetings more regularly than their counterparts from low-performing schools. Percentage wise, around 67% of teachers from high-performing schools indicate that they attend meetings of mathematics professional associations compared to around 47% of the teachers from low-performing schools. This data indicates that teachers from high-performing schools feel themselves more part of the bigger community of mathematics teachers.

<i>Inviting guest speakers or organising field trips</i>		HPS	LPS
<b>Item 16</b> Invite guest speakers or organised field trips relevant to the mathematics taught in class	Yes	33.3	30
	No	66.7	70

In both cases, for teachers from high-performing schools and from low-performing schools, low percentages responded positively with regard to this issue (around 33% and 30%). Again there is no significant difference between responses from high and low-performing schools. There apparently does not exist a culture of inviting guest speakers or organising field trips in either of the two groups, perhaps because most teachers did not know of relevant places to take learners to or did not regard this as being worthwhile.

<i>Involving parents in the mathematics education of their children</i>		HPS	LPS
<b>Item 27</b> Involve parents in the mathematics education of their children	Regularly	16.7	5
	Occasionally	66.7	65
	Never	16.7	30

It is clear that teachers do not involve parents on a regular basis in the mathematics education of their children in either low-performing schools or high-performing schools. It is notable and commendable that a large percentage of teachers do occasionally involve parents in the education of their parents (around 67% in high-performing schools and 65% in low-performing schools). It is also noticeable that there is no real difference between HPS and LPS in this respect.

<i>Assisting learners after normal class</i>		HPS	LPS
<b>Item 52</b> Assist learners after normal class	Always	66.7	50
	Sometimes	33.3	50
	Never	0	0

In terms of assisting learners after normal class around 67% of teachers from high-performing schools indicate that they assist learners in this regard whereas a lower percentage of around 50% of teachers from low-performing schools agree. Teachers from high-performing schools seem to put in extra effort to help learners to develop better understanding of the subject.

### *Précis of findings*

In the majority of the items in this section teachers from high-performing schools seem to outperform the teachers from low-performing schools. The data seem to indicate that teachers from high-performing schools put more effort into their teaching than teachers from low-performing schools with respect to the following activities :

- Attendance of meetings of mathematics professional associations
- Attending college/university courses on the teaching of mathematics
- Assisting learners even after normal class
- Attending college/university courses in mathematics.

These findings seem to indicate that teachers from high-performing schools have more commitment to their profession as mathematics teachers compared to teachers from low-performing schools.

### **6.2.2 Category B: Teacher attitude and self-concept**

In these questions teachers were required to indicate their attitudes towards learners and to present mathematics at a grade twelve level. The aim of this section was to establish their attitude towards mathematics and their confidence in presenting mathematics at



grade twelve level. This section was included because teachers' confidence has been identified as a factor working positively towards mathematics achievement (Stigler & Hiebert, 1999).

Table 6.2.2 Teacher attitude and self-concept

		HPS	LPS
<b>Item 17</b> I am able to make connections between mathematics and other disciplines	Agree	50	63.2
	Neutral	50	26.3
	Disagree	0	10.5
<b>Item 18</b> Additional mathematics textbooks as instructional tools are necessary	Agree	66.7	100
	Neutral	33.3	0
	Disagree	0	0
<b>Item 19</b> I can deal with learners who are not doing well in my class	Agree	83.3	65
	Neutral	16.7	30
	Disagree	0	5
<b>Item 21</b> I enjoy teaching mathematics	Agree	100	95
	Neutral	0	0
	Disagree	0	5
<b>Item 22</b> I am able to connect the mathematics I teach with the tertiary mathematics that I studied	Agree	100	85
	Neutral	0	15
	Disagree	0	0
<b>Item 24</b> I feel confident to teach Grade 12 learners	Agree	83.3	95
	Neutral	16.7	5
	Disagree	0	0



<b>Item 51</b> I make special provision for learners who are not doing well in my class	Always	33.3	35
	Sometimes	66.7	65
	Never	0	0

I subsequently analyse and discuss the results of individual items.

<i>Ability to make connections between mathematics and other disciplines</i>		HPS	LPS
<b>Item 17</b> I am able to make connections between mathematics and other disciplines	Agree	50	63.2
	Neutral	50	26.3
	Disagree	0	10.5

In terms of the ability to make connections between mathematics and other disciplines, 50% of teachers from high-performing schools indicated that they were able to make connections between mathematics and other disciplines, while about 63% of respondents from low-performing schools responded positively. This finding is surprising and indicates that teachers from IPS do not feel themselves under equipped for positioning mathematics within a wider frame of knowledge. Yet they do not succeed in using this knowledge for motivating their students for higher performance.

<i>Need for additional mathematics textbooks</i>		HPS	LPS
<b>Item 18</b> Additional mathematics textbooks as instructional tools are necessary	Agree	66.7	100
	Neutral	33.3	0
	Disagree	0	0

Asked if additional mathematics textbooks as instructional tools are necessary, all teachers from low-performing schools responded positively whereas 67% of teachers

from high-performing schools agree. This finding could point to a lack of textbooks in LPS. The fact that there are no teachers who feel neutral about or disagree with this matter shows how strongly teachers from LPS feel about needing more textbooks.

<i>Dealing with learners who are not doing well</i>		HPS	LPS
<b>Item 19</b> I can deal with learners who are not doing well in my class	Agree	83.3	65
	Neutral	16.7	30
	Disagree	0	5

About 83% of teachers from high-performing schools indicated that they felt themselves able to deal with the problems of learners who were not doing well in their classes compared to only 65% of teachers from low-performing schools. It is interesting that a substantial portion of the respondents from low-performing schools felt themselves incapable of providing for the needs of learners who were not doing well in their classes.

<i>Enjoy teaching mathematics</i>		HPS	LPS
<b>Item 21</b> I enjoy teaching mathematics	Agree	100	95
	Neutral	0	0
	Disagree	0	5

All the teachers from high-performing schools and 95% of the teachers from the low-performing schools indicated that they enjoyed teaching mathematics. This finding is both surprising and pleasing. Teachers from LPS feel happy with their career choice, despite the low performance of students. These teachers enjoy what they do and the reason for poor performance cannot be ascribed to a lack of enthusiasm by the teachers.

<i>Connecting school mathematics with tertiary mathematics</i>	HPS	LPS

<b>Item 22</b> I am able to connect the mathematics I teach with the tertiary mathematics that I studied	Agree	100	85
	Neutral	0	15
	Disagree	0	0

All teachers from high-performing schools and 85% of the teachers from low-performing schools seem to agree with the fact that they are able to connect the mathematics they teach with the tertiary mathematics that they studied. Teachers from both groups are confident of their abilities in mathematics and it becomes evident that teachers from LPS feel themselves equipped for the job and that the blame for learners' poor performance cannot be laid at their door.

<i>Confidence</i>		HPS	LPS
<b>Item 24</b> I feel confident to teach Grade 12 learners	Agree	83.3	95
	Neutral	16.7	5
	Disagree	0	0

A large number of teachers from both HPS and LPS indicated that they feel confident to teach Grade 12 learners. Their responses were around 83% and 95% for HPS and LPS respectively. This finding supports the train of thought developed in the previous paragraph that teachers feel themselves competent to teach and do not accept that the blame for poor performance is due to a lack of competence by them. Yet it remains interesting that only 65% of these teachers from LPS indicated that they were able to deal with learners who were not doing well in their classes (see Item 19 analysis).

<i>Special provision for learners who are not doing well</i>	HPS	LPS
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<b>Item 51</b> I make special provision for learners who are not doing well in my class	Always	33.3	35
	Sometimes	66.7	65
	Never	0	0

In response to this question the majority of teachers from both low and high-performing schools indicated that they only sometimes make special provision for learners who are not doing well in their classes. There is no significant difference between teachers from low and high-performing schools regarding this issue. Making provision for students who are not performing well is perhaps less of an issue in HPS but should be a matter of urgent attention for LPS.

### *Précis of findings*

With regard to attitude and self-concept, teachers from both high-performing and low-performing schools see themselves as competent teachers who can connect their mathematics knowledge to other disciplines and who are confident of their ability to teach grade twelve students. It seems that teachers from LPS do not feel that they are to blame for the poor performance of students.

There is a difference between teachers from HPS and LPS in that teachers from HPS report more strongly on their

- Ability to connect the mathematics they teach with the tertiary mathematics that they studied.
- Ability to deal with learners who are not doing well in their mathematics classes.

A significant finding is that teachers from low-performing schools feel stronger about the need for additional mathematics textbooks as instructional tools.

### 6.2.3 Category C: Teacher perceptions of learners and interaction with learners

The aim of this section was to explore whether teachers regard learners as capable of learning mathematics and to investigate teachers' relationship with mathematics learners.

Table 6.2.3 Perceptions of learners and interaction with learners

		HPS	LPS	
<b>Item 20</b> Learners learn mathematics best in classes with learners of similar abilities	Agree	66.7	50	
	Neutral	16.7	10	
	Disagree	16.7	40	
	Regularly	83.3	70	
	<b>Item 28</b> Advise learners about job opportunities in mathematics, science and technology	Occasionally	16.7	30
		Never	0	0
<b>Item 41</b> Pose open-ended questions	Always	33.3	42.1	
	Sometimes	66.7	47.7	
	Never	0	10.5	
<b>Item 42</b> Engage the whole class in discussion	Always	33.3	45	
	Sometimes	66.7	55	
	Never	0	0	
<b>Item 43</b> Require learners to explain their reasoning	Always	83.3	70	
	Sometimes	16.7	30	
	Never	0	0	
<b>Item 50</b> Make separate presentations to HG and SG learners	Always	0	30	
	Sometimes	50	40	
	Never	50	30	

I subsequently analyse and discuss the results for individual items.

<i>Classes with learners of similar abilities</i>		HPS	LPS
<b>Item 20</b> Learners learn mathematics best in classes with learners of similar abilities	Agree	66.7	50
	Neutral	16.7	10
	Disagree	16.7	40

It is clear from the data that more teachers from high-performing schools than teachers from low-performing schools believe that learners learn mathematics best in classes with learners of similar abilities - around 67% of teachers from high-performing schools agreed with this statement compared to 50% of teachers from low-performing schools. The reason for this opinion may be that the majority of learners in high-performing schools are encouraged to register for mathematics at higher grade level rather than at standard grade level. Secondly, in most of the high-performing schools learners are grouped according to their level of academic performance to encourage competition among them, as indicated in Chapter 4.

<i>Advice to learners about job opportunities</i>		HPS	LPS
<b>Item 28</b> Advise learners about job opportunities in mathematics, science and technology	Regularly	83.3	70
	Occasionally	16.7	30
	Never	0	0

With regard to advising learners about job opportunities in mathematics, science and technology, teachers from high-performing schools seem to do this slightly more often than teachers from low-performing schools (83% compared to 70%). This finding could imply that teachers from low-performing schools need more assistance on mathematics career guidance than the teachers from high-performing schools.

<i>Open-ended questions</i>		HPS	LPS
<b>Item 41</b> Pose open-ended questions	Always	33.3	42.1
	Sometimes	66.7	47.7
	Never	0	10.5

With regard to posing open-ended questions to learners, teachers from both low and high-performing schools seem to be lacking. The fact that in the low-performing schools this activity seems to be employed more frequently is unexpected. A fairly large (67%) percentage of teachers from high-performing schools employ this way of posing questions only sometimes, but this practice is clearly part of the teaching culture as no one attests to never doing this, whereas this practice does not seem to be quite so ingrained in the LPS.

<i>Class discussion</i>		HPS	LPS
<b>Item 42</b> Engage the whole class in discussion	Always	33.3	45
	Sometimes	66.7	55
	Never	0	0

Engaging the class in discussion seems to be a reasonably common practice in both LPS and HPS with everyone doing it sometimes or always. This particular question was perhaps not formulated well because involving the *whole* class in discussion can be difficult, especially if the class is large whereas involving one or two individuals in a discussion is easier and more practical. It is clear that there is no difference of note between LPS and HPS.



<i>Explanation of reasoning</i>		HPS	LPS
<b>Item 43</b> Require learners to explain their reasoning	Always	83.3	70
	Sometimes	16.7	30
	Never	0	0

It seems that teachers from both HPS and LPS put a premium on requiring from learners to explain their reasoning, as 83% and 70%, respectively, testify to doing this always. There is a slight leaning towards HPS doing this more regularly. The notion that teachers from both HPS and LPS feel they do their best to engage and stimulate learners is strengthened by the responses to this question.

<i>Higher and standard grade learners</i>		HPS	LPS
<b>Item 50</b> Make separate presentations to higher and standard grade learners	Always	0	30
	Sometimes	50	40
	Never	50	30

In this item none of the respondents from high-performing schools indicated that they make separate presentations to higher and standard grade learners. The reason for this might be that in high-performing schools higher and standard grade learners will be in separate classes and consequently separate presentations are not necessary. It is also true that higher performing schools encourage their learners to register for mathematics on higher grade level rather than on standard grade whereas learners from low-performing schools are often encouraged to register for mathematics on standard grade level.

### *Précis of findings*

With respect to teachers' perceptions of learners and teachers' interaction with learners, teachers from high-performing and low-performing schools show some differences.

Teachers from high-performing schools surpass teachers from low-performing schools in the following items:

- Their view that learners learn mathematics best in classes with learners of similar abilities.
- They require learners to explain their reasoning in mathematics classes.
- They advise learners about job opportunities in mathematics, science and technology.
- They encourage learners to register mathematics at the higher rather than standard grade.

#### 6.2.4 Category D: Teachers' instructional methods

The purpose of this section was to find out more about teachers' understanding of how grade twelve learners learn best and how mathematics is taught best. Teachers were required to indicate their skills and preferred method regarding mathematics instruction.

Table 6.2.4 Instructional methods

		HPS	LPS
<b>Item 23</b> Letting learners criticise / evaluate their own or other learners' homework is advisable	Always	83.3	80
	Sometimes	16.7	15
	Never	0	5
<b>Item 25</b> Take learners' prior understanding into account when planning a lesson	Always	100	75
	Sometimes	0	20
	Never	0	5
<b>Item 26</b> Cover all mathematical concepts in the syllabus	Always	83.3	60
	Sometimes	16.7	30
	Never	0	10



<b>Item 45</b> Ask learners to explain concepts to one another	Always	50	45
	Sometimes	50	50
	Never	0	5
<b>Item 46</b> Ask learners to seek alternative methods for solutions	Always	66.7	65
	Sometimes	33.3	35
	Never	0	0
<b>Item 47</b> Assign mathematics homework	Always	83.3	95
	Sometimes	16.7	5
	Never	0	0
<b>Item 48</b> Encourage learners to work in groups	Always	83.3	75
	Sometimes	16.7	25
	Never	0	0
<b>Item 49</b> Review homework assignments	Always	83.3	73.7
	Sometimes	16.7	21.1
	Never	0	5.3

I subsequently analyse and discuss the results for individual items.

<i>Learners evaluating their own or other learners' work</i>		HPS	LPS
<b>Item 23</b> Letting learners criticise /evaluate their own or other learners' homework is advisable	Always	83.3	80
	Sometimes	16.7	15
	Never	0	5

On letting learners criticise /evaluate their own or other learners' homework, the majority of teachers in both categories of schools always seem to allow learners to do it. The reason might be that it reduces the burden of marking learners' assignments. This is particularly helpful when dealing with large classes which are mostly the norm in disadvantaged schools.

<i>Prior understanding</i>		HPS	LPS
<b>Item 25</b> Take learners' prior understanding into account when planning a lesson	Always	100	75
	Sometimes	0	20
	Never	0	5

All teachers from high-performing schools claim to take learners' prior understanding into account when planning a lesson whereas 75% of teachers from low-performing schools claim to do so. A small percentage of teachers from low-performing schools confess to never taking learners' prior understanding into account, which is a worrying aspect.

<i>Covering the syllabus</i>		HPS	LPS
<b>Item 26</b> Cover all mathematical concepts in the syllabus	Always	83.3	60
	Sometimes	16.7	30
	Never	0	10

Only 60% of the teachers from low-performing schools always finish the mathematics syllabus whereas around 83% of teachers from high-performing schools cover all mathematical concepts in the syllabus. This would mean most teachers from high-performing schools put more effort into their teaching and make sure that they finish the

syllabus in time. It may also mean that some of the topics are experienced as difficult by teachers from low-performing schools and take more time for them to complete.

<i>Learners explaining to one another</i>		HPS	LPS
<b>Item 45</b> Ask learners to explain concepts to one another	Always	50	45
	Sometimes	50	50
	Never	0	5

With respect to asking learners to explain concepts to one another only about half of the teachers from both high-performing schools and low-performing schools require their learners to do so. It is also interesting to note that, although 83% (HPS) and 75% (LPS) of the teachers acknowledge the importance of group work (see below), only 50% (HPS) and 45% (LPS) ask learners to explain concepts to one another which could be considered as part of group work activities for mathematics.

<i>Alternative solutions</i>		HPS	LPS
<b>Item 46</b> Ask learners to seek alternative methods for solutions	Always	66.7	65
	Sometimes	33.3	35
	Never	0	0

In terms of asking learners to seek alternative methods for their mathematical solutions around 67% and 65% of teachers from high and low-performing schools, respectively, responded positively with respect to this statement. This does not indicate any significant difference.

<i>Homework</i>		HPS	LPS
<b>Item 47</b> Assign mathematics homework	Always	83.3	95
	Sometimes	16.7	5
	Never	0	0

Around 83% of teachers from high-performing schools assign mathematics homework to learners whereas 95% of teachers from LPS do. Although the majority of teachers assign homework tasks to learners, and particularly from low-performing schools, it was clear from learner data analysis in Chapter 4 that more learners from low-performing schools do not undertake these tasks.

<i>Group-work</i>		HPS	LPS
<b>Item 48</b> Encourage learners to work in groups	Always	83.3	75
	Sometimes	16.7	25
	Never	0	0

With respect to encouraging learners to work in groups, teachers from both categories perceived themselves as seemingly competent. This finding is interesting since in the classrooms that I observed (reported in Chapter 4), there were very few opportunities in low-performing schools to work in groups. From this conflicting evidence, it appears as if teachers (in particular for low-performing schools) know what they are supposed to be doing (and claim that they do) but that this does not necessarily realise in the classroom.

<i>Review homework</i>		HPS	LPS
<b>Item 49</b> Review homework assignments	Always	83.3	73.7
	Sometimes	16.7	21.1
	Never	0	5.3

In terms of reviewing homework assignments there is no significant difference between the groups – teachers from both high and low-performing schools claim that they do review homework assignments most of the time.

### *Précis of findings*

With regard to the teachers’ instructional methods, teachers from high-performing and low-performing schools do not show much difference. Teachers from high-performing schools excel in the following items:

- Ability to cover all mathematical concepts in the syllabus.
- Ability to take learners’ prior understanding into account when planning a lesson.

On the other hand, teachers from low-performing schools are more active in assigning mathematics homework.

### **6.2.5 Category E: Perceived causes of poor performance in mathematics**

In this category, teachers were asked to indicate the most important reason (from a given list) in their opinion, for poor performance in mathematics. The results are reflected in Table 6.2.5.

Table 6.2.5: Comparison between HPS and LPS with regard to teachers’ perception of the most important cause for poor performance (given as percentages of the column total)



<b>“Which of the reasons do you regard as the most important cause for poor performance in mathematics?”</b>	HPS	LPS	Total	Percentage
Too many learners in a class	0.00 (0)	10.00 (2)	2	7.7
Not mathematically talented	0.00 (0)	0.00 (0)	0	0.0
Uncertainty about future career	0.00 (0)	10.00 (2)	2	7.7
Uneducated parents	0.00 (0)	0.00 (0)	0	0.0
No respect for teachers	16.67 (1)	20.00 (4)	5	19.2
Not attending extra classes	0.00 (0)	10.00 (2)	2	7.7
Underqualified teachers	16.67 (1)	5.00 (1)	2	7.7
Not expected to perform well	0.00 (0)	5.00 (1)	1	3.8
Not respected by the teacher	0.00 (0)	0.00 (0)	0	0.0
No extra support available	0.00 (0)	5.00 (1)	1	3.8
No collaboration with classmates	66.67 (4)	25.00 (5)	8	30.8
Poor background in mathematics	16.67 (1)	20.00 (4)	5	19.2
Principal is not supportive	0.00 (0)	5.00 (1)	1	3.8
<b>TOTAL</b>	<b>6</b>	<b>20</b>	<b>26</b>	<b>100</b>



### *Précis of findings*

The three main reasons given for poor performance overall are:

- *No respect for teachers*

Having no respect for teachers clearly is problematic. Lack of respect as reason for poor performance has not emerged in the study until now. This finding is enlightening.

- *No collaboration between classmates*

Although teachers overwhelmingly reported that they encourage group work (see section 6.2.4) a different perspective is given here. No collaboration is mentioned as the single most important reason for poor performance. This reason was given by an overwhelming 67% of teachers from high-performing schools and 25% of low-performing schools.

- *Poor background in mathematics*

Poor background in mathematics is also perceived as problematic, by both high- and low-performing schools. This finding is understandably of importance but not surprising.

### **6.3 TEACHERS' RESPONSES TO OPEN ENDED QUESTIONS**

In items 19, 20, 21 and 22, teachers were asked to respond to the following four questions:

- State the three most important factors that contribute to learners' good performance in mathematics in your opinion.
- State the three most important factors that contribute to learners' poor performance in mathematics in your opinion.
- How do you motivate your learners in mathematics?
- Does the principal support you in your mathematics teaching? Describe briefly.

What follows is a report on teacher responses to the four questions. Their responses were grouped into categories. Since teachers responded with three reasons for each question, the percentages do not add up to 100%.

### 6.3.1 Summary of responses on factors contributing to good achievement in mathematics

The responses to the item “State the three most important factors that contribute to learners’ good performance in mathematics in your opinion”, are reflected in Table 6.3.1.1 and Table 6.3.1.2

Table 6.3.1.1 Summary of responses to factors contributing to good achievement in mathematics in low-performing schools

	Teacher number
<ul style="list-style-type: none"> <li>• Motivation</li> <li>• More work</li> <li>• Encouragement to practise always</li> </ul>	T1
<ul style="list-style-type: none"> <li>• Regular practice</li> <li>• Afternoon classes</li> <li>• Group discussions</li> </ul>	T2
<ul style="list-style-type: none"> <li>• Love of the subject</li> <li>• Good attitude</li> <li>• Regular practice</li> </ul>	T3
<ul style="list-style-type: none"> <li>• Regular practice</li> <li>• Asking questions when not understanding</li> <li>• Group work</li> </ul>	T4
<ul style="list-style-type: none"> <li>• Career influence</li> <li>• Ability and interest in the subject</li> <li>• Encouragement</li> </ul>	T6
<ul style="list-style-type: none"> <li>• Group work with classmates</li> <li>• Parental involvement</li> <li>• Competition among learners</li> </ul>	T7
<ul style="list-style-type: none"> <li>• Interest in the subject</li> <li>• Career influence</li> <li>• Learner ability and discipline</li> </ul>	T10
<ul style="list-style-type: none"> <li>• Group work</li> <li>• Alternative solution to problems</li> <li>• Learner own pace</li> </ul>	T13
<ul style="list-style-type: none"> <li>• Enough teaching time</li> <li>• Learner motivation</li> <li>• Facilities</li> </ul>	T14
<ul style="list-style-type: none"> <li>• Regular class attendance</li> <li>• Regular homework</li> <li>• Asking questions in class</li> </ul>	T15
<ul style="list-style-type: none"> <li>• Love for mathematics(interest)</li> <li>• Always practising procedures</li> <li>• Teacher respect</li> </ul>	T16



<ul style="list-style-type: none"> <li>• Regular practice</li> <li>• Class participation</li> <li>• More reference material</li> </ul>	<b>T17</b>
<ul style="list-style-type: none"> <li>• Interest in the subject</li> <li>• Regular practice</li> <li>• Teacher respect</li> </ul>	<b>T18</b>
<ul style="list-style-type: none"> <li>• Regular practice</li> <li>• Interest in the subject</li> <li>• Asking questions in class</li> </ul>	<b>T20</b>
<ul style="list-style-type: none"> <li>• Regular practice</li> <li>• Asking questions in the class</li> <li>• Group work</li> </ul>	<b>T21</b>
<ul style="list-style-type: none"> <li>• Hard work and discipline</li> <li>• Learner motivation</li> <li>• Knowing the basics</li> </ul>	<b>T22</b>
<ul style="list-style-type: none"> <li>• Regular practice</li> <li>• Attitude to subject and educator</li> <li>• Maths is for the selected few</li> </ul>	<b>T23</b>
<ul style="list-style-type: none"> <li>• Regular practice</li> <li>• Practising more problems</li> <li>• Disciplined learners</li> </ul>	<b>T24</b>
<ul style="list-style-type: none"> <li>• Attending regularly</li> <li>• Learner motivation</li> <li>• Teacher dedication and extra classes</li> </ul>	<b>T25</b>
<ul style="list-style-type: none"> <li>• Regular practice</li> <li>• Buying text books for more practice</li> <li>• Attitude towards the subject and the teacher</li> </ul>	<b>T26</b>

Table 6.3.1.2 Summary of responses on factors contributing to good achievement in mathematics in high-performing schools

<ul style="list-style-type: none"> <li>• Motivation</li> <li>• Proper guidance</li> <li>• Regular practice</li> </ul>	<b>T5</b>
<ul style="list-style-type: none"> <li>• Regular practice and extra classes</li> <li>• Homework completion</li> <li>• Regular testing</li> </ul>	<b>T8</b>
<ul style="list-style-type: none"> <li>• Intrinsic motivation</li> <li>• Career influence</li> <li>• Good and dedicated teachers</li> </ul>	<b>T9</b>
<ul style="list-style-type: none"> <li>• Learner motivation</li> <li>• More work and regular practice</li> <li>• Learner encouragement</li> </ul>	<b>T11</b>
<ul style="list-style-type: none"> <li>• Group work</li> <li>• Provision for slow learners</li> <li>• Competition among learners</li> </ul>	<b>T12</b>

<ul style="list-style-type: none"> <li>• Hard work</li> <li>• Group work</li> <li>• Asking questions in the class</li> </ul>	<b>T19</b>
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***Commonalities***

Generally all the teachers, both from high and low-performing schools mentioned that they would like learners to be more motivated. Regular work by learners was also mentioned by almost all teachers as a reason for achievement. Yet regular practice was not evident in low-performing schools as teachers from such schools indicated that their learners come to class without having done their mathematics homework (reported on in Chapter 4). Teachers from both high and low-performing schools also mentioned learners’ working in groups as a factor contributing to good achievement. Yet again it was clear that in low-performing schools, group work was not generally performed (see Chapter 4).

***Differences***

Although there does not seem much difference between what teachers from high and teachers from low-performing schools see as factors contributing to good achievement in mathematics, teachers from low-performing schools mention factors that indicate problematic areas. Factors such as an interest and love of mathematics, respect for the teacher, disciplined learners, attitude towards subject and teacher and teacher dedication all seem to point to what these teachers see as lacking in their schools. None of these factors are mentioned in high-performing schools.

**6.3.2 Summary of responses to factors contributing to poor achievement in mathematics**

The responses to the item, “State the three most important factors that contribute to learners’ poor performance in mathematics” are reflected in Table 6.3.2.1 and Table 6.3.2.2

Table 6.3.2.1: Responses to factors contributing to poor performance in low-performing schools

	<b>Teacher number</b>
<ul style="list-style-type: none"> <li>• Negative attitude</li> <li>• Lack of proper teaching methods</li> <li>• Lazy to do homework and assignments</li> </ul>	<b>T1</b>
<ul style="list-style-type: none"> <li>• Poor background in mathematics</li> <li>• Lack of motivation</li> <li>• Truancy</li> </ul>	<b>T2</b>
<ul style="list-style-type: none"> <li>• Lazy to practice</li> <li>• Poor background in mathematics</li> <li>• Poor parental involvement</li> </ul>	<b>T3</b>
<ul style="list-style-type: none"> <li>• Lack of practice</li> <li>• Negative attitude to the subject and the teacher</li> <li>• Lack of career guidance</li> </ul>	<b>T4</b>
<ul style="list-style-type: none"> <li>• Lack of career guidance</li> <li>• Ignorance</li> <li>• Lack of class participation and discussions</li> <li>• Laziness in class</li> <li>• Lack of practice and basics in mathematics</li> <li>• Do not study hard in mathematics</li> </ul>	<b>T6</b> <b>T7</b>
<ul style="list-style-type: none"> <li>• Lack of discipline</li> <li>• Negative attitude and lack of teacher respect</li> <li>• Not working with others</li> </ul>	<b>T10</b>
<ul style="list-style-type: none"> <li>• Ill-discipline</li> <li>• Lack of commitment</li> <li>• Teacher state of mind</li> </ul>	<b>T13</b>
<ul style="list-style-type: none"> <li>• Laziness</li> <li>• Negative attitude</li> <li>• Not enough practice</li> </ul>	<b>T14</b>
<ul style="list-style-type: none"> <li>• Laziness</li> <li>• Fear of mathematics</li> <li>• Low self-esteem</li> </ul>	<b>T15</b>
<ul style="list-style-type: none"> <li>• Lazy learners</li> <li>• Poor background in mathematics</li> <li>• Lack of parental involvement</li> </ul>	<b>T16</b>
<ul style="list-style-type: none"> <li>• No group work</li> <li>• Do not enjoy mathematics</li> <li>• De-motivation</li> </ul>	<b>T17</b>
<ul style="list-style-type: none"> <li>• Lack of practice</li> <li>• Poor background in mathematics</li> <li>• Poor parental involvement</li> </ul>	<b>T18</b>
<ul style="list-style-type: none"> <li>• Lazy to do their work</li> <li>• Do not attend classes</li> <li>• Do not have enough time</li> </ul>	<b>T20</b>

<ul style="list-style-type: none"> <li>• Peer group off-school activities</li> <li>• Inferiority complex</li> <li>• Lack of discipline even at school</li> </ul>	<b>T21</b>
<ul style="list-style-type: none"> <li>• Ignorance</li> <li>• Low self-confidence in mathematics</li> </ul>	<b>T22</b>
<ul style="list-style-type: none"> <li>• Lack of resources</li> <li>• Lack of guidance</li> <li>• Poor parental involvement</li> </ul>	<b>T23</b>
<ul style="list-style-type: none"> <li>• Lack of motivation</li> <li>• Maths considered as a difficult subject</li> <li>• Lack of practice</li> <li>• Poor teacher preparation</li> <li>• Negative attitude to the subject and homework not controlled</li> <li>• Lack of career guidance</li> </ul>	<b>T24</b> <b>T25</b>
<ul style="list-style-type: none"> <li>• Homework not controlled regularly</li> <li>• Poor discipline in class</li> <li>• Not giving enough exercises</li> </ul>	<b>T26</b>

Table 6.3.2.2: Responses to factors contributing to poor performance in high-performing schools

<ul style="list-style-type: none"> <li>• Undisciplined and lazy learners</li> <li>• Unmotivated learners</li> <li>• Undedicated educators</li> <li>• Teacher negligence of the work</li> <li>• Unqualified teachers in lower grades</li> <li>• Laziness on the part of the teacher</li> </ul>	<b>T5</b> <b>T8</b>
<ul style="list-style-type: none"> <li>• Lazy to attend classes</li> <li>• Lazy to do class work and homework</li> <li>• Not participating in class and failing to ask questions</li> </ul>	<b>T9</b>
<ul style="list-style-type: none"> <li>• Lack of support in extra classes</li> <li>• Lack of learner commitment</li> <li>• Teacher negligence of the work</li> </ul>	<b>T11</b>
<ul style="list-style-type: none"> <li>• Negative attitude towards the subject</li> <li>• Lack of practice</li> <li>• Lack of group work</li> </ul>	<b>T12</b>
<ul style="list-style-type: none"> <li>• De-motivated learners</li> <li>• Poor teaching methods</li> <li>• Lack of daily practice and career guidance</li> </ul>	<b>T19</b>

### *Commonalities*

The inferred problem areas are confirmed by responses to this question. Teachers from low and high-performing schools identify a lack of motivation among learners and outright laziness, probably stemming from a lack of motivation, as possible factors contributing to poor performance. It is not to say that learners in high-performing schools suffer from these factors to the same extent as learners from low-performing schools, but both sets of teachers unanimously identify these factors as contributing to poor performance.

### *Differences*

Ill discipline of learners, a lack of resources, poor background in mathematics and poor parental involvement are factors mentioned specifically by teachers from low-performing schools as contributing to poor performance. It is interesting that teacher attitude and behaviour is hardly mentioned at all, almost as if these teachers are reluctant to have the blame come their way. In contrast, teachers from high-performing schools list poor teaching methods, teacher negligence of the work, laziness on the part of the teacher and undedicated educators as definite contributing factors to poor performance. It is important to note that these teachers are in all likelihood not guilty of such conduct and are therefore not afraid to point to these factors as possibly contributing to poor performance.

### **6.3.3 Summary of responses on how teachers motivate learners in mathematics**

The responses to the item “How do you motivate learners in your mathematics class” are reflected in Tables 6.3.3.1 and 6.3.3.2

Table 6.3.3.1 Summary of responses on how educators motivate their learners in mathematics from low-performing schools.

	<b>Teacher number</b>
<ul style="list-style-type: none"> <li>• Show them that mathematics is easy</li> <li>• Encourage them to be more dedicated</li> <li>• Show them those who made it from their area</li> </ul>	<b>T1</b>
<ul style="list-style-type: none"> <li>• Giving prizes to learners</li> <li>• Inviting a celebrity from engineering</li> <li>• Having more catch-up programmes</li> </ul>	<b>T2</b>
<ul style="list-style-type: none"> <li>• Giving them simple and one complex problem</li> </ul>	<b>T3</b>
<ul style="list-style-type: none"> <li>• Show them opportunities requiring mathematics</li> </ul>	<b>T4</b>



<ul style="list-style-type: none"><li>• Showing them the relevance to daily life</li><li>• Introduce them to role models, former learners who are doing well in mathematics related fields</li></ul>	
<ul style="list-style-type: none"><li>• Giving them extra exercises</li><li>• Career guidance</li><li>• Helping them after classes</li></ul>	<b>T6</b>
<ul style="list-style-type: none"><li>• Showing them the benefits of being a mathematician</li><li>• Encourage them to express him/herself mathematically</li><li>• By giving them work design from simple to difficult tasks</li></ul>	<b>T7</b>
<ul style="list-style-type: none"><li>• By telling them about careers</li><li>• By making them feel special during the lesson</li><li>• By always being there for them</li></ul>	<b>T10</b>
<ul style="list-style-type: none"><li>• Making maths practical</li><li>• Show its importance in careers</li><li>• Providing mathematics guest speakers</li></ul>	<b>T13</b>
<ul style="list-style-type: none"><li>• Talk about the value of mathematics in life</li><li>• Talk about what they are expected to do</li><li>• Give them rewards for achievements</li></ul>	<b>T14</b>
<ul style="list-style-type: none"><li>• Organise career orientation for them</li><li>• Giving them prizes for encouragement</li><li>• Giving them extra work</li><li>• Exempting them from doing other work</li></ul>	<b>T15</b>
<ul style="list-style-type: none"><li>• By telling them about the importance of mathematics</li><li>• By giving prizes to well-deserving learners</li><li>• By advising them about job opportunities</li></ul>	<b>T16</b>
<ul style="list-style-type: none"><li>• Tell them to enjoy mathematics</li><li>• Practise mathematics regularly</li><li>• Work in groups</li></ul>	<b>T17</b>
<ul style="list-style-type: none"><li>• Tell them about the importance of being disciplined</li><li>• They must learn to be independent</li><li>• Encouraging them to form groups for discussions</li></ul>	<b>T18</b>
<ul style="list-style-type: none"><li>• Tell them how to write all steps</li><li>• Encourage them to work very hard</li></ul>	<b>T20</b>
<ul style="list-style-type: none"><li>• Presenting my lesson in a non-threatening way</li><li>• Making them feel confident in the class by not dwelling on their weaknesses</li><li>• Talk to them about career opportunities in mathematics</li></ul>	<b>T21</b>
<ul style="list-style-type: none"><li>• Expose them to career opportunities</li><li>• Take them to different universities to observe</li><li>• Go an extra mile in helping learners</li></ul>	<b>T22</b>
<ul style="list-style-type: none"><li>• Giving them guidance before any activity</li><li>• Giving them projects that involve developed people in mathematics</li></ul>	<b>T23</b>
<ul style="list-style-type: none"><li>• Talk about the career they want to follow</li><li>• Discuss job opportunities in mathematics</li></ul>	<b>T24</b>
<ul style="list-style-type: none"><li>• Showing them the importance of hard work</li><li>• Mathematics career guidance sessions</li></ul>	<b>T25</b>



<ul style="list-style-type: none"> <li>• Inviting role models in mathematics-related careers for motivation</li> </ul>	
<ul style="list-style-type: none"> <li>• Talk about mathematics as a key to job opportunities</li> <li>• Talk about mathematicians and how wise they were</li> </ul>	<b>T26</b>

Table 6.3.3.2 Summary of responses on how educators motivate their learners in mathematics from high-performing schools

<ul style="list-style-type: none"> <li>• Encourage them to ask questions regularly</li> <li>• Talk about advantages of passing mathematics</li> <li>• Best achievers are rewarded</li> </ul>	<b>T5</b>
<ul style="list-style-type: none"> <li>• Talk about the many careers available in mathematics</li> <li>• By awarding prizes to best achievers</li> <li>• Supporting learners when they encounter problems</li> </ul>	<b>T8</b>
<ul style="list-style-type: none"> <li>• Explain to them about job opportunities</li> <li>• Praise when they do things right</li> <li>• Give gifts to high performers</li> </ul>	<b>T9</b>
<ul style="list-style-type: none"> <li>• Show them the importance of mathematics</li> <li>• Tell them about the relevance of mathematics to job opportunities</li> <li>• honouring good work in classes</li> </ul>	<b>T11</b>
<ul style="list-style-type: none"> <li>• Tell them to work hard</li> <li>• Tell them about the vast career opportunities in the field of mathematics</li> <li>• Mentioning names of successful people from their community, those who pursued the field of mathematics and are from the same school.</li> </ul>	<b>T12</b>
<ul style="list-style-type: none"> <li>• Encourage competition among learners</li> <li>• Show relevancy of mathematics in real life</li> <li>• Invite role models in mathematics-related careers and show them how possible to get solutions to problems</li> </ul>	<b>T19</b>

### *Commonalities*

In response to a question on motivation strategies, most of the teachers indicated that they introduced their learners to other high achievers in their communities in mathematics. Furthermore they organise career orientation for them and give them extra work and show them the importance of hard work.

Other common factors include:

- Invite role models of people who are successful in mathematics and science careers who graduated from the same schools.
- Praise and award learners
- Engage their learners in conversation about school work
- Encourage learners to study hard and in some cases made arrangements for them to visit institutions of higher learning.

- Talk about mathematics as a key to job opportunities
- Emphasise career guidance in mathematics-related fields.

### *Differences*

The significant observation in this section is that there are no clear differences between responses from teachers of high- and low-performing schools on how to motivate learners.

### **6.3.4 The principal’s contribution to learners’ achievement in mathematics**

Teachers were asked the question “Does the principal support you in your mathematics teaching? Describe briefly”. By posing this question I wanted to determine the role played by the principal in learner’s mathematics achievement. In this regard teachers related a number of the principal’s supportive actions and problems that impacted on learners’ achievement in mathematics. Responses to this question are reflected in Table 6.3.4.1 and Table 6.3.4.2.

Table 6.3.4:1 Principal’s contribution to learners’ mathematical achievement in low-performing schools

	<b>Teacher number</b>
<ul style="list-style-type: none"> <li>• Supports partially</li> <li>• Informs us about courses in mathematics</li> <li>• Does not buy material on time</li> </ul>	<b>T1</b>
<ul style="list-style-type: none"> <li>• Provides stationary</li> <li>• Helps subsidise field excursion</li> <li>• Provides venue for catch up programmes</li> </ul>	<b>T2</b>
<ul style="list-style-type: none"> <li>• No help, he does not know mathematics</li> </ul>	<b>T3</b>
<ul style="list-style-type: none"> <li>• Initiates cooperation with other schools</li> <li>• Does not welcome initiatives from the teacher</li> <li>• Arranges additional classes without involving the teacher</li> </ul>	<b>T4</b>
<ul style="list-style-type: none"> <li>• Helps with career guidance</li> <li>• Helps with subject choices</li> <li>• Encourage s learners to do mathematics</li> </ul>	<b>T6</b>
<ul style="list-style-type: none"> <li>• Helps in organising Saturday classes</li> <li>• Invites subject specialist</li> <li>• Encourage s exchange programmes with neighbouring schools</li> </ul>	<b>T7</b>
<ul style="list-style-type: none"> <li>• Motivates learners regularly</li> <li>• Supportive during field trips</li> </ul>	<b>T10</b>

<ul style="list-style-type: none"> <li>• Provides teaching materials</li> </ul>	
<ul style="list-style-type: none"> <li>• Supports partially</li> <li>• Informs us about courses in mathematics</li> <li>• Does not buy material on time</li> </ul>	<b>T13</b>
<ul style="list-style-type: none"> <li>• Provides stationary</li> <li>• Helps subsidise field excursion</li> <li>• Provides venue for catch up programmes</li> </ul>	<b>T14</b>
<ul style="list-style-type: none"> <li>• No help he does not know mathematics</li> </ul>	<b>T15</b>
<ul style="list-style-type: none"> <li>• Initiate cooperation with other schools</li> <li>• Does not welcome initiatives from the teacher</li> <li>• Arranges additional classes without involving the teacher</li> <li>• Supports fanatically for excursion</li> <li>• Helps in organising extra classes</li> <li>• Provides stationary for teaching</li> </ul>	<b>T16</b> <b>T17</b>
<ul style="list-style-type: none"> <li>• Helps with career guidance</li> <li>• Helps with subject choices</li> <li>• Encourage s learners to do mathematics</li> </ul>	<b>T18</b>
<ul style="list-style-type: none"> <li>• Helps in disciplining the ill-disciplined learners</li> <li>• Encourage s the interaction among maths teachers within the school</li> <li>• Always ready to buy learner support material</li> </ul>	<b>T20</b>
<ul style="list-style-type: none"> <li>• Helps in learner motivation</li> <li>• Encourage s learners to attend regularly</li> <li>• Make s textbooks available</li> </ul>	<b>T21</b>
<ul style="list-style-type: none"> <li>• Motivates learners regularly</li> <li>• Supportive during field trips</li> <li>• Provides teaching materials</li> </ul>	<b>T22</b>
<ul style="list-style-type: none"> <li>• Instils discipline in school</li> <li>• Provides learning materials needed</li> <li>• Helps in planning extra classes</li> </ul>	<b>T23</b>
<ul style="list-style-type: none"> <li>• Supports partially</li> <li>• Informs us about courses in mathematics</li> <li>• Does not buy material on time; encourages the teachers to attend workshops and courses</li> </ul>	<b>T24</b>
<ul style="list-style-type: none"> <li>• Encourage s the teachers to attend workshops and courses</li> <li>• Supports educational excursions and extra classes arrangements</li> <li>• Provides teaching and learning materials</li> </ul>	<b>T25</b>
<ul style="list-style-type: none"> <li>• Provides stationery</li> <li>• Helps subsidise field excursion</li> <li>• Provides venue for catch-up programmes</li> </ul>	<b>T26</b>

Table 6.3.4.2 Principal's contribution in learners' mathematical achievement high-performing schools

<ul style="list-style-type: none"> <li>• Supports fanatically for excursion</li> <li>• Helps in organising extra classes</li> <li>• Provides stationery for teaching</li> </ul>	<b>T5</b>
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<ul style="list-style-type: none"> <li>• Helps disciplining the ill-disciplined learners</li> <li>• Encourage the interaction among maths teachers within the school</li> <li>• Always ready to buy learner support material</li> </ul>	<b>T8</b>
<ul style="list-style-type: none"> <li>• Help in learner motivation</li> <li>• Encourage learners to attend regularly and maintain discipline</li> <li>• Make textbooks available</li> </ul>	<b>T9</b>
<ul style="list-style-type: none"> <li>• Instil discipline in school</li> <li>• Provide learning materials needed</li> <li>• Help in planning extra classes</li> </ul>	<b>T11</b>
<ul style="list-style-type: none"> <li>• Encourage the teachers to attend workshops and courses</li> <li>• Support educational excursions</li> <li>• Provide teaching and learning materials</li> </ul>	<b>T12</b>
<ul style="list-style-type: none"> <li>• Help in organising Saturday classes</li> <li>• Invite subject specialist</li> <li>• Encourage exchange programmes with neighbouring schools</li> </ul>	<b>T19</b>

### *Commonalities*

There are a number of commonalities between responses of teachers from high and low-performing schools. Principals' encouragement of learners and teachers are valued, as is making textbooks, stationery and other learning materials available. The principal's role in organising extra classes was also mentioned a number of times by both groups of teachers.

### *Differences*

The analysis of this item recognises the fact that the majority of the principals from high-performing schools seem to be highly supportive of the teachers and assist in organising extra classes programmes. Principals through their leadership created a school climate and set practices that promote successful teaching and learning for mathematics. Teachers from high-performing schools considered the principal as the person who plays a vital role in mathematics achievement. The type of support offered by the principal mentioned includes providing books and materials for learning, disciplining learners, encouraging improvement of teacher's qualifications, and organizing extra lessons to give learners remedial assistance. Teachers from poor performing schools are more critical towards the principal. It is believed that the principal does not welcome initiative from the teacher, does not buy material on time and arranges additional classes without involvement from the teacher. Among these factors, the principal's involvement in managing learner

discipline was often mentioned as being especially important in high-achieving schools whereas in the case of low-performing schools the principal's role of providing books and material for learning was mostly mentioned.

#### **6.4 SUMMARY ON CHAPTER FINDINGS**

Although teachers from both high and low-performing schools agree on several factors, there are some factors which vary. From these teachers' responses the factors that appear to contribute to achievement in mathematics are those that are indicated by teachers from high-performing schools which include:

- Attendance of mathematics professional associations.
- Attending college/university course on the teaching of mathematics.
- Assisting learners after normal classes.
- Attending college/university mathematics course for their personal development.
- Cooperative learning (group work and class discussions).

Factors mentioned by teachers from low-achieving schools include:

- Low teacher confidence, in terms of dealing with learners who are not performing well in mathematics.
- Limited special teacher involvement in own professional development.
- Limited access to knowledge of mathematics career opportunities in order to assist learners.
- Prevalent attitude by the teachers that learners will fail because of their poor background in mathematics.

In chapter 7 I will summarise and interpret the findings from the literature study, from both the qualitative and quantitative part of the data collection, namely classroom observation, focus group interviews and questionnaires.